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(54) NEW BODY DEODORANT COMPOSITIONS

(71) We, L'OREAL, a French body
 Corporate of 14 Rue Royale, 75008 Paris,
 France, do hereby declare the invention, for
 which we pray that a patent may be granted
 to us, and the method by which it is to be
 performed, to be particularly described in
 and by the following statement:—

The present invention relates to body de-
 odorant compositions as well as to a process
 for controlling objectionable odours due to
 bacterial decomposition of perspiration.

Hitherto, in addition to materials which
 absorb the odours, two main classes of pro-
 ducts for combating objectionable odours to
 human perspiration are known. The first
 class are products which block or greatly
 reduce perspiration, such as astringents,
 notably aluminium salts and especially alu-
 minium hydroxychloride. Such composi-
 tions make it possible to prevent the for-
 mation of objectionable odours by eliminat-
 ing their direct cause, namely the emission
 of perspiration by the epidermis.

The second class of products do not affect,
 or only slightly affect, the volume of the
 perspiration but which, by virtue of their
 bactericidal or antiseptic effect, destroy the
 bacteria which are responsible for the de-
 composition of this perspiration. Such pro-
 ducts include hexachlorophene, bithionol
 (bisphenol) and quaternary ammonium com-
 pounds such as Cequartyl as well as certain
 ion exchange resins and metal chelates such
 as 1,3-diketone chelates.

These two classes of product are not
 wholly satisfactory because, on the one
 hand, the astringent or anti-perspirant com-
 positions stop perspiration, which is a
 natural phenomenon, and furthermore have
 an unfavourable effect on the epidermis,
 and, on the other hand, the bactericidal
 compositions have the disadvantage of com-
 pletely destroying the microbial flora of the
 skin and consequently of interfering with
 the biological equilibrium of the epidermis,
 which is naturally undesirable.

The present invention is based on the

surprising discovery that it is possible to
 prevent the malodorous decomposition of
 perspiration by micro-organisms without it
 being necessary to employ conventional
 astringent substances or bactericidal sub-
 stances which completely modify the micro-
 bial flora of the skin.

The present invention provides a deodor-
 ant composition suitable for body hygiene
 which comprises together with a cosmetic-
 ally acceptable vehicle, a mixture of (i) at
 least one weak organic acid and (ii) at least
 one salt of a weak organic acid with an
 organic amine, each said weak organic acid,
 which may be the same or different having
 the empirical formula $C_nH_m(OH)_x(COOH)_y$,
 n being 0 or an integer from 1 to 6, m being
 an integer from 1 to 8, x being 0, 1 or 2
 and y being 1, 2 or 3 and a molecular weight
 not exceeding 192, which mixture, when
 applied to the skin, maintains the pH of
 the perspiration at a substantially fixed value
 of 3 to 6.

We have found that by using such com-
 positions it is possible to forestall, and hence
 to prevent, the formation of objectionable
 odours without significantly altering the
 bacterial flora present on the epidermis. In
 other words, the compositions of this inven-
 tion have a selective action on the bacteria
 which are essentially responsible for the
 bacterial degradation of perspiration lead-
 ing to the formation of objectionable odours.
 Consequently, the compositions according
 to the invention do not significantly inter-
 fere with the biological equilibrium of the
 epidermis, unlike broad-spectrum bactericidal
 agents such as hexachlorophene which have
 been used in the past.

We have also found that by using, as the
 active ingredient, a mixture of a weak
 organic acid and a salt of a weak organic
 acid and an organic amine it is possible to
 obtain excellent cosmetic formulations. In
 effect, the active ingredient exhibits excellent
 solubility in the usual cosmetic solvents,
 which makes it possible to obtain a great
 variety of formulations without undesirable

phenomena, such as precipitation, taking place.

Suitable weak organic acids which can be used in the compositions of this invention include formic acid, acetic acid, citric acid, malic acid, lactic acid, tartaric acid, adipic acid, phthalic acid, salicylic acid and succinic acid. It will be appreciated that the weak acid used to prepare the salt need not be the same as the free weak acid used in the composition.

Suitable organic amines which can be used for forming the salts may contain a primary, secondary or tertiary amine group; such amines can be monofunctional or polyfunctional such as aminoalcohols, aminoacids or amine polymers. Heterocyclic compounds are not excluded. Suitable amines include:

aminocalcohols such as 2-amino-2-methyl-1-propanol, 2-amino-2-methyl-1,3-propanediol, monoethanolamine, diethanolamine, triethanolamine, monoisopropanolamine, diisopropanolamine and triisopropanolamine, aminoacids such as histidine, arginine, lysine and ornithine, amine polymers such as the cationic polymers resulting from the condensation of piperazine, epichlorohydrin and diglycolamine, and polyoxyethylenated or polyoxypropylenated fatty amines, or compounds such as ortho-tolylbiguanidine or S-benzylsteamine.

As indicated above, the compositions according to the invention, after having been applied to the skin and after any volatile constituents have evaporated due to body heat, and/or after having become mixed with perspiration, should be capable of maintaining the pH of the latter at a substantially fixed value which is from 3 to 6.

In general, the pH imparted to the perspiration should not exceed the pK of the acid present in the composition or, if it is greater, the pH imparted to the perspiration should be at most 0.8 higher than the pK if the pK of the acid is from 3 to 4.5, at most 0.5 higher if the pK of the acid is from 4.5 to 5 and at most 0.2 higher if the pK of the acid is from 5 to 6.

In general, it has been found that the best results can be obtained if the pH imparted to the perspiration has substantially the same value as the pK of the weak acid employed.

The efficiency of the mixture is the greater, the closer to 3 is the pH imparted to the perspiration. From a cosmetic point of view, a pH of 3 constitutes an acceptable limit for good toleration by the mucous membranes of the skin and especially by those of the axially inguinal and interdigital regions.

The deodorant compositions according to the present invention can be in various forms

and in particular in the form of aqueous solutions which may contain alcohol, provided, of course, that the mixture which constitutes the active ingredient is soluble in the cosmetic vehicle. The compositions can also consist of a solution of the active ingredient in an organic solvent such as an alcohol, which evaporates rapidly after application of the composition to the epidermis. Preferably, the composition is in the form of an aerosol and is packaged in an aerosol container in the presence of a propellant gas which can be liquefied under pressure, such as trichlorofluoromethane or dichlorodifluoromethane or a mixture thereof. It is also possible to use, as the propellant gas, carbon dioxide or nitrous oxide, either by themselves or mixed with halogenated hydrocarbons such as those listed above.

The alcohols used in the compositions according to the invention are preferably ethanol or isopropanol.

The compositions according to the invention can also be in the form of emulsions of the oil-in-water or water-in-oil type, with the aqueous phase of the emulsion containing the mixture constituting the active ingredient.

Amongst the oils which can be employed to constitute the oily phase of the emulsions there may in particular be mentioned hydrocarbon oils such as paraffin oil, purcellin oil (esters of C_8-C_{18} fatty acids), perhydro-squalene and solutions of micro-crystalline wax in oils; animal or vegetable oils such as sweet almond oil, avocado oil, calophyllum oil, lanoline, castor oil, caballine oil, pork oil, olive oil and sunflower oil; mineral oils having an initial distillation temperature, at atmospheric pressure, of about 250°C ., and a final distillation temperature of the order of 410°C .; and saturated esters such as isopropyl palmitate, alkyl (C_8-C_{18}) myristates such as isopropyl myristate, butyl myristate and cetyl myristate, hexadecyl stearate, ethyl palmitate, triglycerides of octanoic and decanoic acids, cetyl ricinoleate and alkyl (C_8-C_{18}) adipates and sebacates. Silicone oils which are soluble in other oils such as dimethylpolysiloxane, methylphenylpolysiloxane and silicone/glycol copolymers can also be used in the oily phase.

The compositions according to the invention can also be in the form of gels or sticks. The sticks may consist of soaps dissolved in ethyl alcohol and polyols, such as glycerol or propylene glycol, into which is incorporated an alcoholic or aqueous-alcoholic solution of the active ingredient. It is, of course, also possible to formulate sticks from waxes, oils, fatty alcohols and conventional emulsifiers, in particular fatty amides such as copra monoethanolamide and stearic acid diethanolamide.

The various types of composition can contain any other ingredient generally used in such types of compositions.

It will, of course, be appreciated that the salt of the weak organic acid with the organic amine can be produced *in situ* in the composition when mixing the various ingredients, or can, if desired, be prepared separately, as, for example, in the case of S-benzylcysteamine malate.

It is clear that the pH conditions specified above should be achieved when the composition has been applied to the epidermis, after evaporation of any volatile additives. Thus, for example, the compositions applied to the skin can, as indicated above, contain a substantial amount of alcohol and have, at the time of application, a pH outside the specified range, provided that after evaporation of the alcohol or other volatile constituents on the epidermis, the perspiration is kept in the pH range from 3 to 6.

The concentration of the mixture in the composition can vary within rather wide limits. It depends on the solubility of the mixture and also on the method of application because it is clear that it is the concentration of the active ingredient in the perspiration which determines its efficiency, and not the concentration of the active ingredient in the actual composition. Now the concentration of the active ingredient in the perspiration depends, on the one hand, on the amount of composition applied and, on the other hand, on the volume of perspiration emitted during a given time.

In general terms, if the pK of the acid is less than or equal to 5, the concentration of the acid should be at least 10^{-2} M if the pH of the solution is less than the pK or does not exceed the latter by more than 0.2 unit, whilst the concentration of the acid should be at least equal to 0.5×10^{-1} M if the pH exceeds the pK by more than 0.2 unit.

If the pK of the acid is greater than 5, the concentration of the acid should, in general terms, be at least 0.5×10^{-1} M.

In general, the mixture (active ingredient) is present in an amount from 0.5 to 15% by weight based on the total weight of the composition.

The present invention also provides a process for forestalling the formation of objectionable body odours due to the bacterial decomposition of perspiration, which process comprises applying to the axillary, inguinal and/or interdigital regions, a composition according to the invention in an amount sufficient to maintain the pH of the perspiration at a value of 3 to 6, generally for an extended period. Usually, the deodorant effect achieved by the compositions according to the invention can be maintained for at least 24 hours.

The following Examples further illustrate the present invention.

EXAMPLE 1: A deodorant in the form of an alcoholic spray is prepared by mixing the following ingredients:

acetic acid	...	...	0.53 g	
2 - amino - 2 - methyl - 1,3 - propanediol	...	...	0.44 g	
perfume	...	...	0.5 g	75
absolute alcohol, q.s.p.	...	...	30 g	

This composition is then packaged in an aerosol container in the presence of:

trichlorofluoromethane	...	...	42 g	80
dichlorodifluoromethane	...	...	28 g	

The use of this spray, by application to the armpits, makes it possible, after evaporation, to maintain the pH of the perspiration at 4.9 and to forestall the formation of objectionable odours.

EXAMPLE 2: An alcoholic deodorant spray is prepared, according to the invention, by mixing the following ingredients:

lactic acid	...	...	0.79 g	
2 - amino - 2 - methyl - 1 - propanol	...	...	0.39 g	95
perfume	...	...	0.5 g	
absolute alcohol, q.s.p.	...	...	30 g	

This composition is then packaged in an aerosol container in the presence of:

trichlorofluoromethane	...	...	42 g	
dichlorodifluoromethane	...	...	28 g	

The application of this spray under the armpits makes it possible, after evaporation, to maintain the pH of the perspiration at 4.2 and to prevent bacterial degradation of the perspiration.

EXAMPLE 3: An aqueous-alcoholic deodorant spray is prepared according to the invention, by mixing the following ingredients:

tartaric acid	...	...	30 g	
monoethanolamine	...	...	19.9	
perfume	...	...	5 g	
water	...	...	200 ml	
ethanol, q.s.p.	...	...	1,000 ml	120
saturation of the solution with nitrous oxide under a pressure of	...	...	7 kg/cm ² .	

The use of this spray makes it possible to maintain the pH at 4.3 and to prevent the formation of unpleasant odours for an extended period.

EXAMPLE 4: A deodorant lotion is prepared, according to the invention, by mixing the following ingredients:

5	citric acid. 1H ₂ O	42 g
	cationic polymer resulting from the condensation of piperazine, epichlorohydrin and diglycolamine in 28.7% strength aqueous solution (product described in French Patent. No. 74/27,030)	180 ml
10	ethanol	200 ml
	perfume	1 g
15	water, q.s.p.	1,000 ml

This lotion, applied under the armpits, makes it possible, after evaporation, to maintain the pH at 5.

EXAMPLE 5: An aqueous-alcoholic deodorant spray is prepared according to the invention, by mixing the following ingredients:

25	malic acid	26.8 g
	diethanolamine	30.6 g
	water	200 ml
	perfume	5 g
30	ethanol	1,000 ml

The solution is saturated with CO₂ under a pressure of 7 kg/cm².

The use of this spray under the sole of the feet makes it possible, after evaporation, to maintain the pH at 3.9.

EXAMPLE 6: An alcoholic deodorant spray is prepared, according to the invention, by mixing the following ingredients:

40	succinic acid	1.04 g
	triethanolamine	1.76 g
	perfume	0.5 g
45	absolute alcohol, q.s.p.	30 g

This composition is then packaged in an aerosol container in the presence of:

50	trichlorofluoromethane	42 g
	dichlorodifluoromethane	28 g

This spray, applied under the armpits, makes it possible, after evaporation, to maintain the pH at 5.1.

EXAMPLE 7: A deodorant lotion for manual spraying is prepared according to the invention, by mixing the following ingredients:

60	tartaric acid	30 g
	ortho-tolyl-biguanidine	70 g
	perfume	5 g
65	water	350 ml

ethanol, q.s.p. ... 1,000 ml
after evaporation, to maintain the pH under

The use of this solution makes it possible, the armpits at 4.5.

EXAMPLE 8: A deodorant aqueous-alcoholic spray is prepared, according to the invention, by mixing the following ingredients:

	lactic acid	18 g
	"Propomeen" (registered Trade Mark) C ₁₂ [an amine derived from the fatty acids of copra polyoxypropyleneated by means of 2 mols of propylene oxide]	29.8 g
	perfume	5 g
	water	100 ml
	ethanol, q.s.p.	1,000 ml

The solution is saturated with nitrous oxide under a pressure of 7 kg/cm².

After spraying and evaporation, this alcohol spray makes it possible to maintain the pH at 3.75.

EXAMPLE 9: A deodorant lotion for manual spraying is prepared, according to the invention, by mixing the following ingredients:

	lactic acid	18 g
	arginine	15.5 g
	perfume	1 g
	water	150 ml
	ethanol, q.s.p.	1,000 ml

This solution, applied under the armpits, makes it possible, after evaporation, to maintain the pH of the perspiration at 3.85, and thus avoids the formation of objectionable odours over the 24 hours which follow the application.

EXAMPLE 10: An aqueous - alcoholic spray is prepared, according to the invention, by mixing the following ingredients:

	malic acid	13.4 g
	S-benzylcysteamine malate	19.3 g
	perfume	5 g
	water	100 ml
	ethanol, q.s.p.	1,000 ml

The solution is saturated with nitrous oxide under a pressure of 7 kg/cm².

This spray, when sprayed under the armpits, makes it possible to maintain the pH at 3.4.

EXAMPLE 11: A deodorant emulsion is prepared, according to the invention, by mixing the following ingredients:

lactic acid	2.11 g	water	100 ml
2-amino-2-methyl-1-propanol ...	0.9 g	ethanol, q.s.p.	1,000 ml
propylene glycol	23.5 g		
stearyl cetyl alcohol polyoxyethyl- eneated with 15 mols of ethylene oxide	28 g	This lotion when sprayed to the under- arm area and after evaporation of the volatile portion thereof maintains the pH of the perspiration at 3.4, thus avoiding the for- mation of unpleasant odours.	70
cetyl alcohol	4.7 g		
paraffin oil	11.7 g		
isopropyl myristate	4.7 g		
10 water	23.5 g	EXAMPLE 16: In accordance with the present invention deodorant lotion for manual spraying is prepared by mixing the following components:	75
This emulsion, when applied under the armpits, makes it possible to maintain the pH of the perspiration at 4.0.			
15 EXAMPLE 12: A deodorant lotion is pre- pared, according to the invention, by mixing the following ingredients:		o-phthalic acid	16.6 g 80
		arginine lactate	26.2 g
		perfume	1 g
		water	150 ml
		ethanol, q.s.p.	1,000 ml
20 lactic acid	18 g		85
L-lysine	14.6 g	This lotion when sprayed to the under- arm area and after evaporation of the volatile fraction thereof maintains the pH of the perspiration at 3.2.	90
ethanol	700 ml		
perfume	1 g		
25 water, q.s.p.	1,000 ml	EXAMPLE 17: In accordance with the present invention a deodorant gel is pre- pared by mixing the following components:	95
This solution, after manual spraying under the armpits, makes it possible to maintain the pH at 3.9.		succinic acid	23.6 g
30 EXAMPLE 13: A deodorant lotion is pre- pared, according to the invention, by mixing the following ingredients:		monoethanolamine	6.1 g
		hydroxy ethyl cellulose	45 g
		water, q.s.p.	1,000 ml
35 acetic acid	12 g		100
L-ornithine	13.2 g	This gel when applied to the underarm area maintains the pH of the perspiration at 4.6, thus avoiding the formation of un- pleasant odours for 24 hours following the application.	105
ethanol	800 ml		
perfume	1 g		
40 water, q.s.p.	1,000 ml	WHAT WE CLAIM IS:—	
This solution, after manual spraying under the armpits, makes it possible to maintain the pH at 5.1.		1. A deodorant composition suitable for application to the human body which com- prises, together with a cosmetically accept- able vehicle, a mixture of (i) at least one weak organic acid and (ii) at least one salt of a weak organic acid with an organic amine, each said weak organic acid, which may be the same or different, having the empirical formula $C_nH_m(OH)_x(COOH)_y$, n being 0 or an integer from 1 to 6, m being an integer from 1 to 8, x being 0, 1 or 2 and y being 1, 2 or 3, and a molecular weight not exceeding 192, the acid and salt being present in an amount such that the com- position is capable of producing a pH of 3 to 6 in perspiration on the skin.	110 115 120
45 EXAMPLE 14: A deodorant lotion is pre- pared, according to the invention, by mixing the following ingredients:		2. A composition according to claim 1 in which the acid is formic acid, acetic acid, citric acid, malic acid, lactic acid, tartaric acid, adipic acid, phthalic acid, salicylic acid or succinic acid.	125
50 orthophthalic acid	33.2 g	3. A composition according to claim 1 or 2 in which the organic amine is a mono- functional or polyfunctional compound hav-	130
L-histidine	48.4 g		
55 water	500 ml		
perfume	1 g		
ethanol, q.s.p.	1,000 ml		
This solution, after manual spraying under the armpits, makes it possible to maintain the pH at 4.8.			
60 EXAMPLE 15: In accordance with the present invention, a deodorant lotion for manual spraying is prepared by mixing the following components:			
lactic acid	9 g		
65 S-benzyl cysteamine malate ...	19.3 g		
perfume	1 g		

ing a primary, secondary or tertiary amino group.

4. A composition according to any one of the preceding claims, in which the organic amine is an aminoalcohol which is 2-amino-2-methyl-1-propanol, 2-amino-2-methyl-1,3-propanediol, monoethanolamine, diethanolamine, triethanolamine, monoisopropanolamine, diisopropanolamine or triisopropanolamine.

5. A composition according to any one of claims 1 to 3, in which the organic amine is an amino-acid which is histidine, arginine, lysine or ornithine.

6. A composition according to any one of claims 1 to 3, in which the organic amine is a cationic polymer resulting from the condensation of piperazine, epichlorohydrin and diglycolamine or is a polyoxyethylenated or polyoxypropylenated fatty amine.

7. A composition according to any one of claims 1 to 3, in which the organic amine is *ortho*-tolyl-biguanidine or S-benzyl-cysteamine.

8. A composition according to any one of the preceding claims, in which the pH imparted to the perspiration on the skin is substantially equal to the pK of the weak organic acid of component (i).

9. A composition according to any one of the preceding claims, in which the mixture is present in an amount from 0.5 to 15% by weight based on the total weight of the composition.

10. A composition according to any one of the preceding claims, in which the vehicle is an aqueous or aqueous-alcoholic solution or an organic solvent.

11. A composition according to claim 10 in which the organic solvent is an alcohol.

12. A composition according to any one of the preceding claims, in which the vehicle comprises a mixture of an alcohol and a propellant gas liquefied under pressure, the composition being packaged in an aerosol container.

13. A composition according to claim 11 or 12 in which the alcohol is ethanol or isopropanol.

14. A composition according to any one of claims 1 to 10 which is in the form of an oil-in-water or water-in-oil emulsion, the aqueous phase of the emulsion containing the said mixture.

15. A composition according to any one of claims 1 to 10, which is in the form of a gel or stick.

16. A composition according to claim 1 substantially as hereinbefore described.

17. A composition according to claim 1 substantially as described in any one of the Examples 1 to 14.

18. Process for forestalling the formation of body odour which comprises applying to the axillary, inguinal and/or interdigital regions of the body a composition as claimed in any one of the preceding claims in an amount sufficient to maintain the pH of body perspiration at a value from 3 to 6.

19. Process according to claim 18 in which the composition is applied so as to maintain the pH from 3 to 6 for a period of at least 24 hours.

20. Process according to claim 18 substantially as hereinbefore described.

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